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United States Patent [19]

Zito

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[54] ELECTROCHEMICAL ENERGY STORAGE
AND POWER DELIVERY PROCESS
UTILIZING IRON-SULFUR COUPLE

[75] Inventor: Ralph Zito, Chapel Hill, N.C.

[73] Assignee: National Power PLC, Whiltshire,
United Kingdom

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Related U.S. Application Data

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429/90; 429/199; 429/188

[58] Field of Search 204/DIG. 4; 429/14,
429/15, 22, 51, 61, 90, 199, 188

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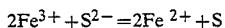
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Primary Examiner—Kathryn Gorgos
Attorney, Agent, or Firm—Antonelli, Terry, Stout &
Kraus

[57]

ABSTRACT

An electrochemical process for energy storage and power generation comprises a single cell or an array of unit cells (10), each cell comprising a positive electrode (12) and a negative electrode (14) with a membrane in each cell dividing it into positive and negative chambers (22C and 24C) for posilyte and anolyte solutions (22, 24) which are recirculated through separate pumps (26, 28) and storage tanks (32, 34) and back to the chambers. An iron-sulfur couple is employed, the overall reaction being:



eq. 8

the Fe^{3+} ions being provided as the chloride, bromide or iodide and the sulfide being provided as the sodium, potassium, lithium or ammonium salts. The $+ve$ chamber contains a soluble ionic salt which acts as a charge carrier during energy storage, preferably sodium or potassium chloride. A pH control system can be provided to offset pH in the system, and further a third chamber (23C) can be provided whereby the system is more effectively electrically rechargeable.

12 Claims, 8 Drawing Sheets

